

FORTHCOMING EVENTS

Engineering Conference, 1994

The 1994 Annual National
Convention of The Institution of
Engineers, Australia.
13 - 16 April 1994
Melbourne, Victoria
Includes the plaquing of the
famous Spotswood Pumping
Station.



Prospect Reservoir - Sydney

Presentation of an Historic
Engineering Marker

Picnic / BBQ on site - BYO
17th April 1996 11am to
commemorate Heritage Week



First Australasian Conference,
Seventh Australian National
Conference on Engineering
Heritage 1994

"Old Ways in a New Land"

28-30 November 1994
The Arts Centre, Christchurch,
New Zealand
See page 4 for details



"Age of Redundancy"

Redundant Sites and Buildings
Whose Responsibility?
Australia ICOMOS Conference
Launceston
Tasmania
May 20 - 22, 1994
See page 8 for details



First International Conference on Engineering Heritage

Eighth Australian National
Conference
Newcastle, 1996

In just two hundred years of Australian colonisation, we have had to develop an infrastructure which has taken European countries centuries to evolve. That infrastructure, much of it engineering, is expensive to build and difficult to co-ordinate, given the size and population of our country.

It would therefore make sense that we should preserve what we already have. And, given our short history, what we do have is all the more precious. For our own sense of cultural identity and our sense of social and political place in the global context, it is crucial we conserve as much of our National Estate as possible.

The Australian Heritage Commission supports The Institution of Engineers, Australia, in its efforts at National and State level to raise awareness and bring about the conservation of our heritage.

One such cooperative approach has been in the development of the "Engineering Heritage and Conservation Guidelines". They were published with assistance of a \$15,000 grant from the Heritage Commission under the Commonwealth's National Estate Grants Program.

The National Estate Grants Program began in 1973 and since then has given more than \$60 million for over four thousand projects throughout Australia.

Most of the projects are jointly administered by State and Commonwealth governments, except for a few, such as the development of the engineering heritage guidelines, which have a national focus.

Funds are juggled so that a balance is maintained between the three aspects of the National Estate - places of historic, natural and aboriginal significance.

Apart from the conservation of specific sites, areas and buildings, the program ultimately helps raise public awareness about the National Estate and its importance to all Australians.

The Institution's plaquing program and the conservation guidelines will do the same among the engineering profession. They are intended to assist in understanding the significance of places of heritage value before they are altered in any way or disposed of - their ultimate aim being to reduce conflict and minimise the likelihood of loss of significant parts of our heritage.

Significant historic places encompass buildings, bridges, pipelines, harbours, railway stations, power stations, factories - the list is long and reflects Australia's whole cultural, social and industrial history.

At the Australian Heritage Commission we have been developing a Register of the National Estate which now lists ten and a half thousand places. Many of these places would be of some engineering interest - about 1,000 are industrial sites and 250 are bridges.

Hampden Bridge has been on our Register since 1986 when a major study was undertaken by Professor Colin O'Connor of the University of Queensland to determine which bridges should be registered.

In conclusion, to ensure better protection of our heritage and less conflict in the process, all parties involved in any development or preservation action must talk to each other.

Engineers have a pivotal role to play in this process - it is you who have the technical expertise to properly assess the conservation of engineering heritage items and places.

Co-operative communication is vital. The Commission will continue to consult extensively with professional bodies such as yours so that all voices can be heard in planning and conservation processes.

I commend the work of the Institution of Engineers' Heritage Panel and confirm the wish of the Australian Heritage Commission to work even more closely with the engineering profession in the future.

Taken from a speech by Alex Marsden, Director, Historic Environment Section, Australian Heritage Commission given at the launch of the Institution's Heritage and Conservation Guidelines.

Australian Chosen As Eminent Speaker

The Institution has approved the recommendation of the National Committee on Engineering Heritage that Professor Henry J Cowan, AO be appointed Eminent Speaker for 1994.

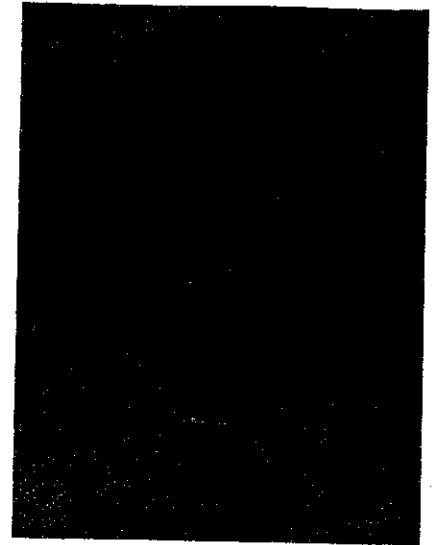
Professor Cowan is the first Australian to be chosen as an Eminent Speaker on Heritage. He is a member of the Sydney Division Heritage Committee, and will speak in all States prior to giving the Keynote Address at the Christchurch Conference in November.

Professor Cowan is renowned for his popular addresses on historical engineering themes, and his many publications on these projects. His public addresses draw large attendances not only from engineers, but from the wider audience of building history and science interests.

His preliminary programme is:

Sydney	18 April
Newcastle	TBA
Perth	17 June
Adelaide	21 June
Brisbane	26 September
Townsville	28 September
Cairns	29 September
Canberra	19 October
Melbourne	20 October
Hobart	22 October
Christchurch	24 November to 1 December

To hear an exciting address from Professor Cowan contact your local Division of The Institution of Engineering for details.



Professor Henry J Cowan



National Committee on Engineering Heritage

COMMITTEE MEMBERS 1993 - 1994

Chairman	Mr Tony Moulds Western Australia
Deputy Chairman	Mr Paul Hagenbach Sydney

Committee:

Mr Keith Drewitt	Tasmania
Mr Bill Jordan	Newcastle
Mr Deane Kemp	South Australia
Mr Byrne Kenny	Canberra
Mr Ken McInnes	Victoria
Mr Bill Oliver	Queensland
Dr Don Fraser	Supernumary
Mr Harry Trueman	Supernumary

Corresponding Members:

Mr Ian Bowie	Sydney
Mr Denis Cumming	Western Australia
Mr Tony Greenwood	Northern Territory
Mr Bruce James	Western Australia
Mr John Moynihan	Western Australia
Mr John Pollard	New Zealand
Mr Charles Smith	Tasmania
Mr Jim Whitehead	AusIMM Vic
Em Prof Ray Whitmore	Queensland

Executive Officer:

Mr Robert Breen IEAust National Office

Loss of Titan

Titan, the 73-year-old crane from Sydney's Cockatoo Island capsized off the northern NSW coast in late December last year.

It had been sold in Sydney to a Singapore-based company as part of the auction of materials from Cockatoo Island in Sydney Harbour.

The crane left inner-Sydney Pyrmont to be refitted in Singapore.

Australian National Maritime Museum's fleet manager Steven Segerstrom said loss of the Titan would be a great blow to what was left of Australian technical heritage.

"In terms of its historical value, it has great social significance to the port of Sydney because it was such a long-lived piece of equipment," Mr Segerstrom said.

Titan was built in Britain in 1919 and was involved in unloading nearly every piece of big equipment from ships in Sydney Harbour, he said.

That included locomotives for State Rail, turbines and generators for the Electricity Commission and even Charles Kingsford-Smith's plane, Southern Cross.

"Technically it was without rival and was involved in things that would have been otherwise impossible," Mr Segerstrom said.

Attempts to right the 52 metre crane proved too difficult for the towing tug and was dragged further out to sea and sunk so it would not become a hazard to ocean traffic.

Australian News

Worlds Oldest Existing McNaught Beam Engine

Over two years ago the engine, which was built by A & W Smith & Co of Glasgow in 1854, was put on display at the Hobart Technical College.

In 1885 the engine was operating in Henry Clark & Co's Sawmill in Collins Street Hobart; this business was later bought out by Risby Bros in 1921.

In 1955 after a century of working, the engine was placed into storage for some 35 years.

The engine is a McNaught Compound Engine weighing some 25 tonnes and the flywheel alone which is 3.7 metres in diameter weighs nine tonnes. The placement of the two cylinders on either side of the central column was the

subject of a patent taken out by McNaught in 1845. Most early compound engines had the two cylinders positioned on the same side of the column.

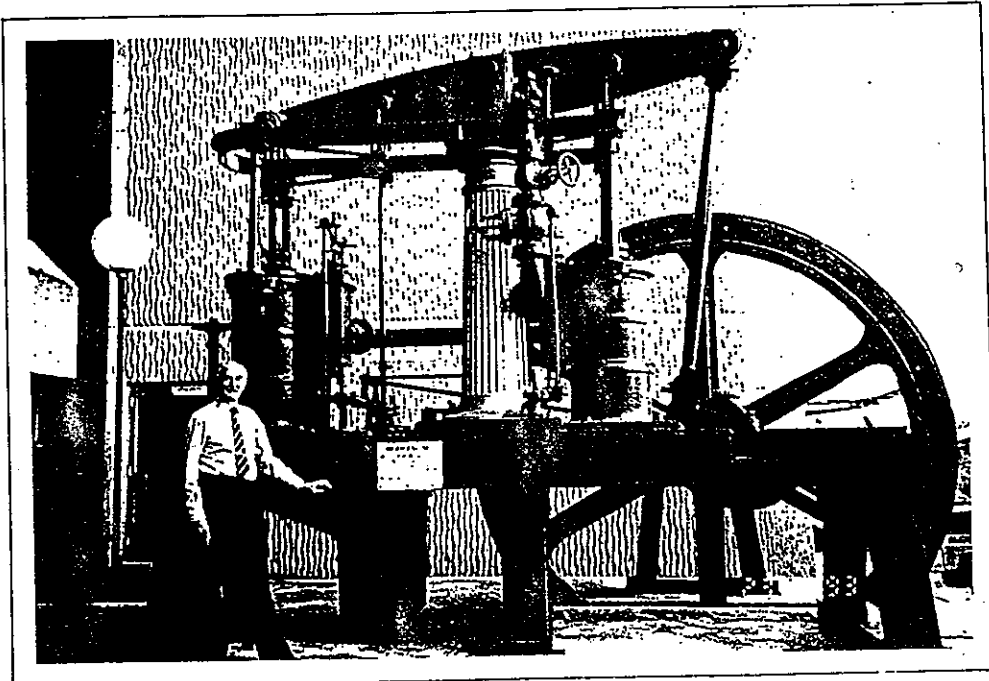
In other respects the engine is somewhat similar to other early engines and incorporates the parallel link motion which was patented by James Watt in 1784.

Following upon discussions with delegates at an Engineering Heritage Conference conducted by the Institution of Engineers, Australia in Hobart last October, further enquiries were made in Britain, and it is now believed that this engine is the worlds oldest McNaught Compound Engine in existence. The

oldest known existing engine of this type in Britain was built in 1865.

The engine is therefore of great historical interest. Unfortunately little is known of the early history of the engine prior to 1885 and its original use and date of arrival in Australia are a mystery.

The College Council Chairman, Fred Lakin, would therefore be most interested to hear from any person having more information or early photos of the engine.



Card Index to Foundation Society Publications

The card index to the Foundation Society Publications has been microfiched by the National Office Information Resource Centre and sufficient copies have been made to issue one each to the IEAust Division Engineering Heritage groups. These can be seen by approaching any Division. All the publications are available from the Information Resources Centre.

**The Institution of Engineers Australia
and
The Institution of Professional Engineers New Zealand
invite you to the**

**First Australasian Conference on Engineering
Heritage**

at
**the Arts Centre Christchurch
Monday November 28 to Wednesday November 30 1994**

This conference has been organised by the National Engineering Heritage Committees of the IEAust and IPENZ. It continues the traditions of the two-yearly Australian Heritage conference by

- providing a forum where heritage research can be reported, discussed and recorded.
- offering a low-key low budget opportunity for heritage enthusiasts to meet
- providing visits to heritage highlights

For many New Zealand engineers the Arts Centre will provide a return to the past - to the place they knew as Canterbury College.

There will be an optional 3 day pre-conference tour starting with a trip on the Trazalpine railway to Arthurs Pass, then by bus through the Otira Gorge, up to the Westport coal fields and back over the Lewis Pass. This is grand heritage country. John Rochfort surveyed it; here C.Y. O'Connor, Western Australia's "Chief", first honed his engineering skills; here three Dobsons are remembered, and along the way four IPENZ 1990 plaques commemorate some of our greatest engineering achievements. For good measure there will be ghost towns, the Bunner beehive ovens, Coaltown, the Reefton hydro remains, hot springs and the wild sea coast.

The trip is also a preamble to the conference theme of "Old Ways in a New Land". Many an engineer sailed from Britain eager to transform the Empire's empty territories. In both Australia and New Zealand they learned by harsh experience that the seemingly benign lands held many an alien hazard. To their consternation some discovered that the tried and true technologies of their motherland failed in the southern colonies. Our joint Australian and New Zealand heritage is a testament to their ability to successfully adapt, modify and sometimes totally rethink the old ways.

Participation in the conference and the pre-conference tour is not limited to engineers. It is intended to provide a forum for papers from all interested in engineering heritage - historians, archaeologists, architects, conservators and people from related sciences.

If you are interested in coming to the conference or joining the tour (you can do either or both), please post us the coupon below.



**The Conference Administrator,
First Australasian Conference on Engineering Heritage,
Department of Continuing Education, University of Canterbury,
Private Bag 4800,
CHRISTCHURCH**

☐ I wish to be sent more conference and/or tour information when it becomes available.

NAME

ADDRESS

Contact Phone/Fax

Scienceworks Volunteers

From time to time, the Museum of Victoria offers voluntary work opportunities suitable for a wide range of community members, young and senior, skilled and not so experienced. A variety of situations has been advertised recently, based both at the Swanston Street Museum and at Scienceworks, the Museum's Centre for Science and Technology.

Last year for instance Scienceworks was looking for volunteers with time available at weekends, school and public holidays to work with visitors and encourage participation in activities and outdoor events. Volunteers with an expressed interest in science and

technology and a specific interest in one or more of the exhibition themes of Energy, Invention, Materials or Travel, were also sought to serve as occasional demonstrators and explainers of various exhibitions.

Of interest to readers also may be the call for volunteer crew members to work on restoration of the machines and fittings in the historic Spotswood Sewage Pumping Station, which forms part of the Scienceworks Museum, and for person(s) with an interest in the history of engineering and /or public health to serve as guide(s) at the pumping station.

For further information about the Volunteers Work programmes at Scienceworks contact the Manager of Group Programs at 2 Booker Street, Spotswood 3015, telephone: (03) 392 4840.

Editors Note - I would be interested in hearing of any other projects or programmes such as this which may be of interest to the readership of the newsletter; for instance the WA Division of IEAust were approached recently for volunteers to help man an exhibition of model marine engines at the Maritime Museum in Fremantle. Make use of your Newsletter!



Telecom Curator of Technology

The History Trust of South Australia, with three year funding support from Telecom, has recently appointed a Curator of Technology to manage the Telecom Museum collection.

The collection, formerly displayed to the public at heritage-listed Electra House in Adelaide, is being relocated to other Telecom premises.

Curator, Peter Strawhan, with a background in archives management, historical research and technology, will liaise with Telecom and museum volunteers to ensure continuing access to the collection.

In addition, Peter will be looking at the wider area of South Australia's technological heritage with the support

of committed local groups, including the Engineering Heritage Branch of the Institution of Engineers.



Engineers Appointed to Queensland and WA Heritage Councils

EMERITUS PROFESSOR RAY WHITMORE who was professor of Mining and Metallurgical Engineering in the University of Queensland from 1967 to 1985 and Dean of Engineering from 1974 to 1976 has been appointed to the State Heritage Council. The Council was established under the Queensland Heritage Act 1992 and the appointment is for three years.

Heritage became an increasing part of Professor Whitmore's professional work after 1976. He was the first chairman of the Queensland and the National Heritage Panels established by the Institution of Engineers, Australia and a founder member of the Queensland Historians' Institute and the Brisbane History Group (of which he was President in 1987 and 1988). He is a

member of the Mineral Heritage Committee of the Australasian Institute of Mining and Metallurgy and of both the Brisbane City and the Ipswich City Heritage Advisory Committees. In 1988 he was elected to Honorary Fellowship of The Institution of Engineers, Australia for "conspicuous service to the profession" and "unequalled knowledge of engineering heritage in Australia".

Among Professor Whitmore's extensive writings are a three-volume social and technical history entitled "Coal in Queensland" and a paper about the Windmill on Wickham Terrace, Brisbane (Queensland's oldest building) which won the John Monash Medal of the Institution of Engineers, Australia in 1990.

The Heritage Council of Western Australia welcomed four new members in June last year. Heritage Consultant Dr Avril O'Brien, architect Ross Chiscolm, and engineer Bruce James were appointed by the Minister for Heritage at the end of May. Historian Dr Cathie Clement, co-opted to the Council last year, has been appointed to full membership.

Mr James worked for thirty-seven years as an engineer with the State Energy Commission before retiring in 1987. He is currently the Chair of the Engineering Heritage panel of the West Australian Division of the Institution of Engineers, Australia.

Historic Mining Sites in the National Estate Register

Mining, a considerable factor in shaping Australian history and development, is represented on the Register of the National Estate by a great diversity of sites.

These include the obvious sites such as the actual places of mining activity, mines of various types, the landscape it produced, machinery and processing plant still in place; treatment works, water collection and diversionary works, administration and other works structures, waste heaps, accommodation buildings, mining towns, Schools of Mines, transport facilities, and large, complex conservation precincts.

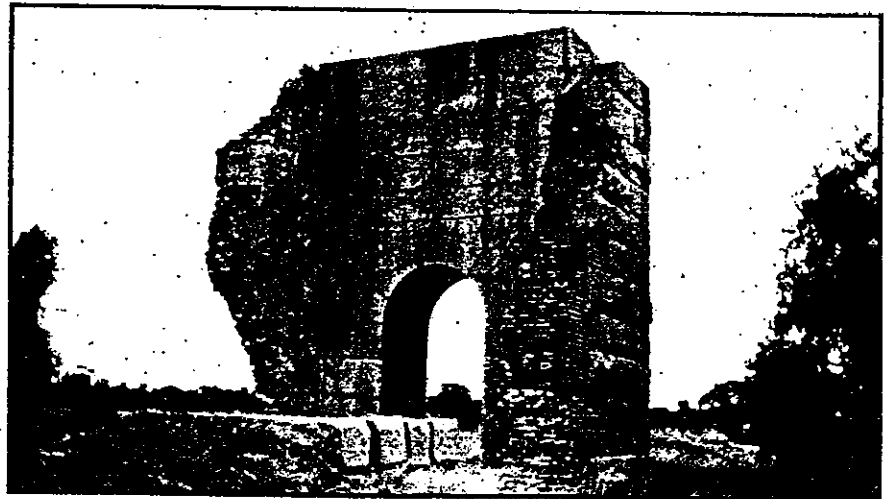
These places present the richness of Australian mining history through explicit reminders of the mining activity itself but also through the related sites which might include evidence of industrial history, labour history, gender and work, cultural diversity, racial conflict, conservation history, lifestyle, social distinctions, variety in the scale of economic investment, personal hardship, commercial success, boom and bust cycles, disasters, religious observance, recreational activity, mercantile development, and community development.

Three historical mining sites are shown, illustrating the diversity of such places.

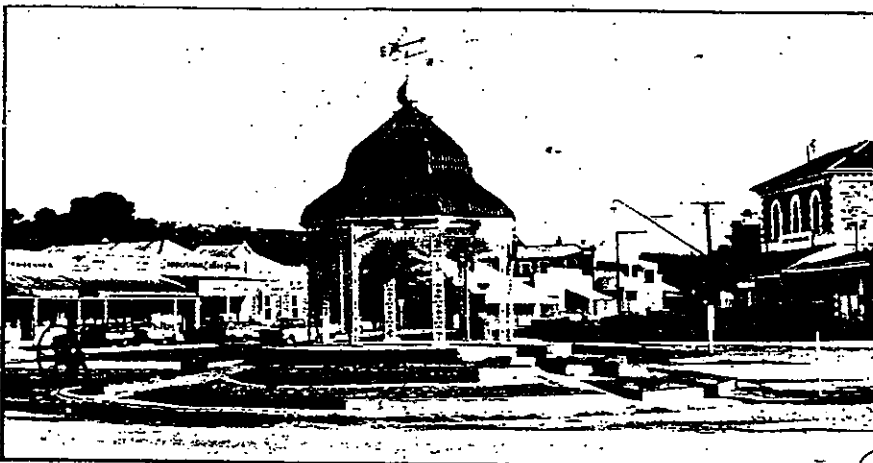


Office, dam and cooling tower, Richmond Main Colliery, Pelaw Main, NSW.

The grand office building, dam and unusual cooling tower (1908-1912) relate to the first phase of the Richmond Main Colliery. At its peak, in the early decades of the twentieth century, it was one of the best equipped and most productive collieries in the Cessnock coalfields.



Duke and Timor Beam Engine House Ruins, Bowenvale, Victoria The remains demonstrate the massive scale of the machinery needed to overcome the extreme flooding problems in the deep lead alluvial gold mines of the area. They housed the largest beam engine used in Victoria which was made in Cornwall and installed here in 1873.



Market Square, Town of Burra, South Australia.

Established in 1845, Burra is a very early Australian mining and industrial town and is on the Register of the National Estate. The township supported the exploitation of the copper ore and represents the earliest example of transplanted Cornish mining and domestic architecture. Burra was significant in that its copper made a major contribution to saving South Australia from bankruptcy in the 1840's.

from Heritage News Oct/Nov, 1993

Our Roads Scholar "Ways of the World" by Dr Max Lay - Reviewed

It's not an Irish joke but PETER COSTIGAN learns that computers in Melbourne can control traffic jams in Dublin!

Next time you complain about a bumpy, ramplingly road don't grumble about the road engineers. Blame the goats who created it.

Yes, goats. Real goats and donkeys and mules and cattle and numerous other four-footed beasts who were the real creators of the world's road systems.

We citizens of the 20th century have achieved enormous freedom of personal movement which is one of the greatest achievements distinguishing this century from any other.

There are few better people in the world who can explain the basic relationship between the animal world and mankind's modern ability to get about than Melbourne's Maxwell Gordon Lay, the director of Quality and Technical Resources at VicRoads and an RACV councillor.

Max is no household name but he is one of those Australians who for many years has been honoured and regarded beyond our shores as at the top of his profession.

For instance, his book, "The Handbook of Road Technology," published in the mid-1980's, is the seminal text on how to make roads. It is studied and used in hundreds of universities and road building institutions around the world but it is not easily available at your local shopping centre bookstore.

Not so his newest book, "Ways of the World," which took more than three years to write, because roads fascinate Lay and will equally delight people who like to sit down for a good "read".

Way, of course, is the original name for what we now call roads, streets, highways, trails, bike paths, freeways and so on.

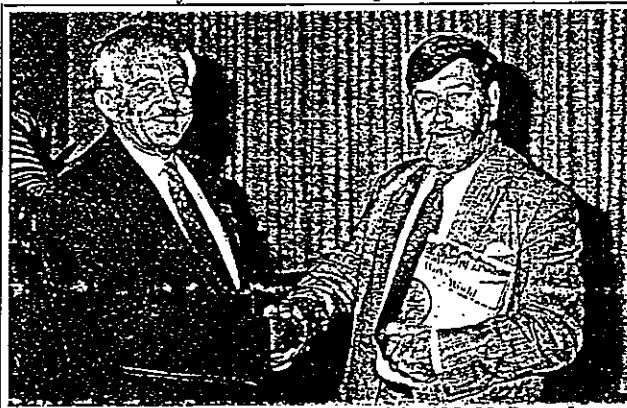
Roads began some 12,000 years ago which is where the goats came in. In their search for food they used some animal instinct to find the easiest way across the land.

Man, in his search for food and to satisfy curiosity, followed the animal's tracks and was able to do something no

animal could do; make the ways permanent.

And how permanent many of them have become. Having been personally driven at 150km/h down Rome's famous Apian Way in a bus escorted by platoons of motor cycle-mounted Italian military (while covering an American Presidential visit to Italy) I can attest to the longevity and superb grading of the roads, permanent legacies of the Roman Empire.

Max Lay devotes much space in his



Dr Max Lay with the Federal President of the ALP, Mr Barry Jones

book to the Romans. Their ability to build the world's first continental road system may have been driven by their determination to conquer the world, also made possible by their invention of concrete and their obsession with indestructible engineering.

"You'd have to say that the Romans over-engineered their roads," Max Lay says - not entirely in a spirit of praise.

His highest praise and a lot of pride is reserved for Victoria.

VICTORIA: A Roads Leader

"Our system of spraying bitumen on dirt is a world leader and the secret is the way we compact the underlying material properly," he says.

But our road leadership does not end with roadmaking. Max Lay says that Melbourne's system of linked traffic signals is the best in the world though (warning!) Sydney is catching up.

Melbourne's system has already been exported to Dublin where traffic lights are actually linked to VicRoads' computer centre in Camberwell. Several times, Australian engineers in

the eastern suburbs have untangled traffic jams across the globe in the Irish capital without leaving their computer screens.

Fascinating "Ways of the World" examines all the big questions about the creation of the world's road systems from the influence of animals (much of our rural road network, for example, follows the contours and directions pointed by bullocks in the old days) to the enormous impact of military demands and the modern motor car.

And, on roads, we might well ask: Why does half the world drive on the left of the road and the rest on the right?

Why was the wheel invented?
Who first created bridges?
How did that famous road and vehicle engineering of the Romans contribute to the fall of their empire?

These are some of the questions Max Lay tackles in his romantic look at the road. Fascinating also for school projects.

Without two major decisions in his own private life, Australia and the world (his book is being published in the United States), travellers and road lovers would not have got this chance to read Max Lay's history of the road.

In 1975 when he was working for BHP as the Engineering Research Manager, the Big Australian offered him the chance to become "Mr Steel" by running the Whyalla steel complex.

He delayed by saying he wanted to talk to his wife about it then at a party they overheard that there was a job running the Road Research Board at Vermont.

Max applied and was selected.

In 1985 Max Lay was in the British Museum researching an article on roads and discovered that there were literally no books of the history of one of mankind's most important inventions. There and then he decided to fill the gap.

The world now has a history on the subject likely to become as much the definitive work in the field of road history as Max Lay's first book is on how to make them.

Royal Auto June 1993

Oral History - Sydney Division

After a number of false starts the oral history project for Sydney Division got under way at the end of 1992. Rather than undertake the process of themselves acquiring the necessary skills, the Committee negotiated the services of historian Richard Raxworthy who, amongst his publications, includes the biography of J.J.C. Bradfield ("The Unreasonable Man").

The project was made possible by a special grant from Sydney Division of the Institution and funding has been extended for a further year.

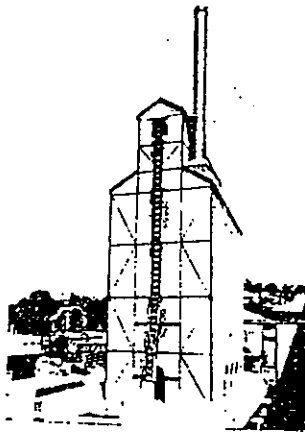
A list of possible names was readily suggested by members of various committees and those selected were first telephoned by either Mr Raxworthy or a member of the Engineering Heritage Committee. A follow-up letter was then sent, requested a curriculum vitae in order to plan the interview.

Just over forty senior engineers in the region have been interviewed, with little apparent shortage of nominees. Some care has been necessary in order to co-ordinate the work with the oral history

project of the Public Works Department of New South Wales.

At present, the record is on tape only but the possibility of transcription, even to the stage of writing biographical notes, is being investigated. The priority, at present, is seen as obtaining the first tapes.

Copies are destined for the Mitchell Library and, for this purpose, forms of release are required from interviewees so that future research from the tapes is possible.



Age of Redundancy

Redundant Sites and Buildings
WHOSE RESPONSIBILITY?

AUSTRALIA
ICOMOS
CONFERENCE

LAUNCESTON
TASMANIA
MAY 20-22 1994

A conference to question the responsibilities of government, owners, heritage bodies and individuals to the growing number of redundant sites and buildings in the community.

In a time of recession and technological change heritage sites and buildings are becoming redundant all over Australia. Whose responsibilities are these? What use can they be put to or will they remain as decaying white elephants?

Changing technology and practices dictate that many industries house redundant sites - railway sites, gas works, mills, mines, hop and brick kilns lie unused. Industrial sites are not the only ones affected. Governments are cutting back facilities with schools, hospitals and public buildings being put up for sale.

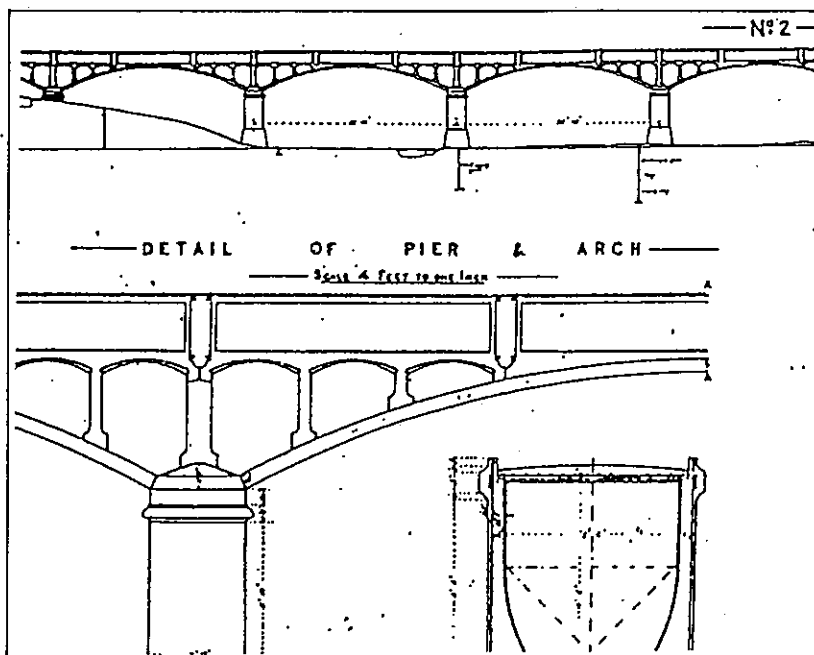
Whose responsibility is it to ensure the cultural significance of these sites is maintained? What will happen or what should happen to these places?

The conference will bring together developers, heritage specialists, building industry representatives, all levels of government, community bodies and interested individuals to debate these issues.

The conference will blend site visits, speakers, open discussion and workshops.

The Johnston's Creek and White's Creek Aqueducts Receive Historic Engineering Markers

These aqueducts were recognised by the Institution of Engineers, Australia as being historically significant engineering works. The Plaque was unveiled by representatives of the Institution, Sydney Water Board and Leichhardt Council.



Structural Significance

The Aqueducts were the first structures in Australia to incorporate reinforced concrete using the Monier System.

Joseph Monier, a Paris gardener, manufactured flower pots and tubs which he strengthened with an embedded mesh of iron wires. In 1807 he patented his invention and over the next five years took out patents for pipes, arch bridges, beams and reservoirs.

The Aqueducts were designed by Mr W J Baltzer of the Public Works Department. Mr Baltzer received his engineering education in Germany. On a visit there in about 1890 he made a study of the Monier System to large works.

The Aqueducts were built by engineering firm Carter, Gummow and Forest who held the agency in New South Wales for the Monier System.

The Monier System is applied successfully to major engineering and building works throughout the world.



Industrial Heritage Strategy Conference for Western Australia

The Institution's West Australian Division Engineering Heritage Panel and the Heritage Council of Western Australia have agreed to cooperate in the preparation of a strategy for the conservation of the state's industrial heritage. A prime objective of the strategy will be to guide and advise private enterprises, commonwealth and state government instrumentalities, and local government authorities regarding the conservation of places and things which are important to our understanding of the history of the state's industrial activity in the state, and to organise an industrial heritage conference to be held in 1994.

The date for the 2 day Conference has been set for Wednesday and Thursday, 15th and 16th June 1994.

The Venue for the Conference will be "A Shed", Victoria Quay, Fremantle.

A draft programme has been drawn up and speakers are currently being contacted to present papers.

The Conference will be opened by The Hon. Richard Lewis, Minister of Planning and Heritage.

Historic Bridge Falls Under Croat Attack

The Stari Most, the 16th Century stone bridge in Mostar, one of Bosnia-Herzegovina's greatest architectural treasures, collapsed on 10 November 1993 in a barrage of Croatian shells.

It was a moment that Bosnians, particularly those under siege in eastern Mostar, prayed would never happen.

For at least 25,000 Bosnians trapped on the east side of the city, the collapse of the old bridge is a disaster. Not only is it a tremendous blow to the morale of the defenders of the eastern ghetto but is also a strategic victory for the Croats.

The bridge was the only access to a source of potable water, which people retrieved by a scurrying across at night under threat of sniper fire. It was also the main route to the places where the frontline crossed into west Croatian Mostar.

Built in 1566, supposedly with mortar made from egg whites, the Stari Most was the last and the most treasured of seven that spanned the Neretva River. It was once compared to a rainbow rising up to the Milky Way and was included in the United Nations list of worldwide cultural heritage. But the war turned it into a battle-scarred monument to the gap between the Croats and Muslims fighting for control of Mostar.

"It is one of the most beautiful bridges in the world" wrote the British author Rebecca West in her pre-World War II travelogue of Yugoslavia, 'Black Lamb and Grey Falcon'. A slender arch lies between two round towers, its parapet bent in a shallow angle in the centre".

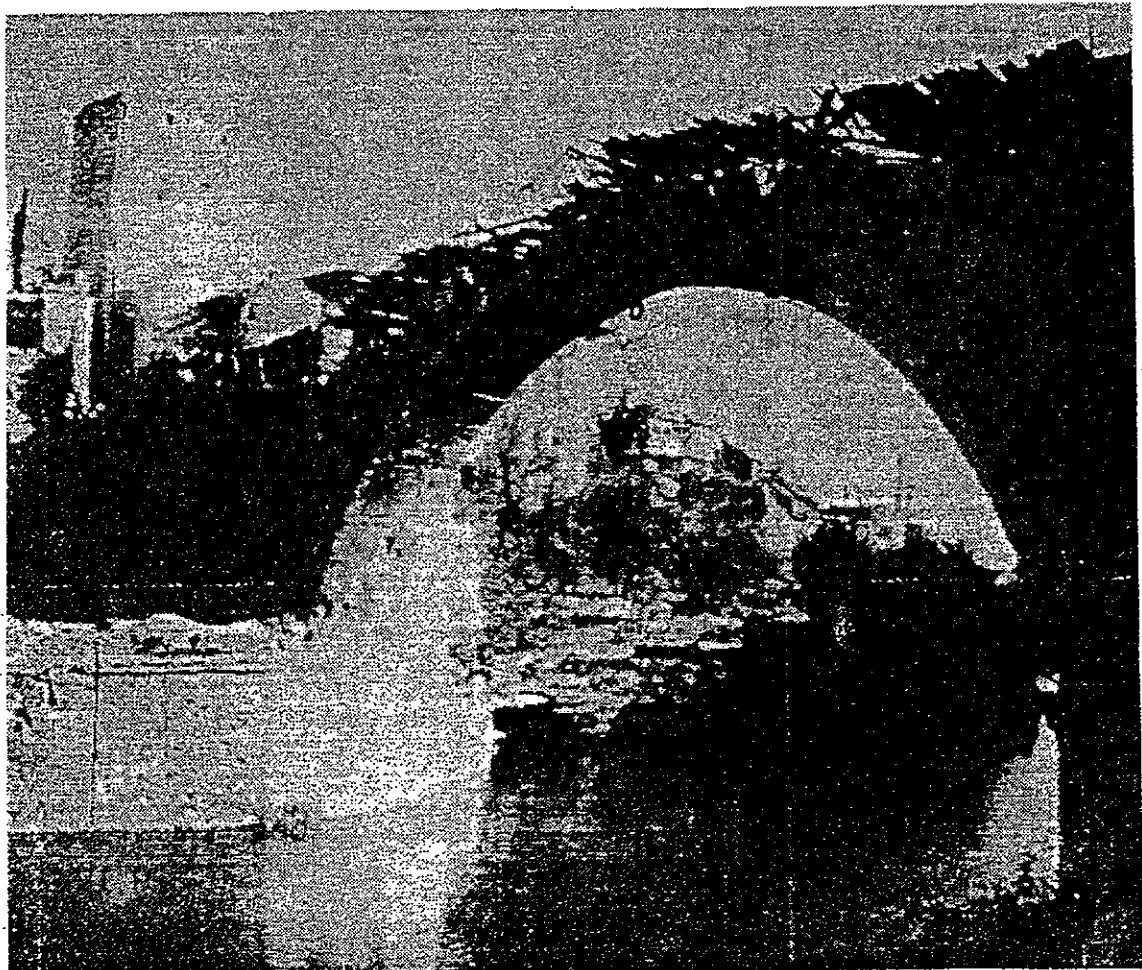
Many considered it a miracle that the delicate Ottoman bridge had survived so long. Pitted by sniper and mortar fire, its steep arch was festooned with old

car tyres suspended from scaffolding in a gallant but futile attempt to protect it.

The bridge had taken dozens of direct hits during the last 19 months, but finally gave way when 60 shells fired from Croatian positions rained down on it on 10 November, 1993.

Mr Veso Vegar, the spokesman for the Bosnian Croat Defence Council in Mostar, said the bridge probably collapsed on its own.

The only remaining bridge connecting east and west Mostar is a rickety rope and wood plank suspension bridge close to Croat positions, in easy range of snipers. Some Croatian sources said the Stari Most was destroyed in response to a string of defeats the Bosnian army has inflicted on the HVO in central Bosnia.



Miraculously the Stari Most bridge was still standing in November 1993. But on Tuesday, 9 November, after surviving 18 months of war, it finally collapsed under the stress of heavy shelling.

British Engineering Since 1945

The importance of engineering in the shaping of current British society does not always seem to be appreciated by either policy-makers or historians. The Institute of Contemporary British History, the Newcomen Society and The Fellowship of Engineering therefore held a two day conference at the Science Museum on the weekend of 27-28 June 1992 on 'British Engineering Since 1945'. This not only reassessed the considerable engineering advances that have been made in this period and the vital contribution engineering makes to the maintenance of Britain's manufacturing base, but also its wider impact on the British economy, politics and society. The intention was to draw attention to the important role that engineers and engineering have played in Britain's post-war history and economy, to provide a better understanding of that role and the explore ways in which their expertise could be better utilised.

The two day conference looked at the engineering profession and at areas of engineering closely affected by government policy and engineering in industry. It drew attention not only to engineering achievements but to their role both in the successful implementation of policy and in the maintenance of Britain's competitive base.

Papers included:

- 'The Engineering Profession', Professor Angus Buchanan, Director of the Centre for the History of Technology, University of Bath.
- 'Government Policy and Technological Change', Dr David Edgerton, Centre for the History of Science, Technology and Medicine, University of Manchester.
- 'Lord Hinton of Bankside', Professor Margaret Gowing CBE FRS FBA FRHistS, Emeritus Professor of the History of Science, University of Oxford; author of 'Independence and Deterrence: Britain and Atomic Energy 1945-1952'.
- 'Conversion to High Pressure Gas', Sir Denis Rooke, CBE FRS FEng, Past President of The Fellowship of Engineering; Past Chairman of British Gas.
- 'The Mechanization of the Coal Face - Civil Engineering', Lord Howie of Troon FICE, General Manager, New Civil Engineer since 1976; member of the Committee of Inquiry into the Engineering Profession 1977-80.
- 'Engineering Design', Dr C Richard Chaplin, Department of Engineering, Reading University.
- 'Production Engineering', Professor J V Connolly FRAeroS, First Professor of Aircraft Production at Cranfield Institute of Technology.
- 'Electrical Engineering', Dr Brian Bowers, Senior Curator of Electrical Engineering, Science Museum.
- 'Professional Self Regulation and the State: The Case of Chemical Engineering', Dr Colin Divall, School of Science and Technology Policy, Manchester Polytechnic.
- 'Telecommunications', Dr James Foreman-Peck, Fellow of St Antony's College, Oxford.
- 'Biotechnology', Professor Malcolm Lilly, Department of Engineering, University College, London.

Library at a Loss

A shortage of cash has forced one of the world's largest engineering libraries, the Engineering Societies Library in New York, to stop buying books and abandon its improvement plans. The director, David Scharf, who was hired two years ago to modernise the library, was sacked last month.

The library, founded early this century, holds half a million volumes, some from the 15th century. But its facilities are antiquated; ironically for an engineering library, it is still not fully computerised and most of its records are on a card index.

The library will remain a repository for the five American engineering societies which operate it.

New Scientist 20/3/93

Missing Persons Biography

An extremely weighty tome arrived at the New Scientist office the other day. It came from the Oxford University Press, and was entitled, 'The Dictionary of National Biography: Missing Persons'. At first Feedback thought that in a moment of aberration the authors had hit on the bizarre idea of combing through police archives in order to come up with the biographies of 1086 people who had run away from their parents, spouses or creditors, or otherwise vanished without a trace.

Not so, however. The 1086 entries are culled down from over 100 000 individuals that outraged readers of OUP's 'The Dictionary of National Biography' had considered eminent enough to be included in the work, but weren't. Some, such as Wilfred Owen and Stan Laurel, are household names whose exclusion from the main dictionary is a puzzle. But many are also scientists for, as the OUP press release disarmingly admits, "Science, technology, maths are all areas that weren't treated particularly handsomely in the DNB up to now."

The book, which will initially cost 65 pounds (rising to 80 pounds on 31 March), is published on 28 January.

New Scientist 16/1/93

Towers Removed to Preserve Ancient Monument

The demolition of a landmark in UK broadcasting history is being complicated by the need to preserve an ancient monument.

The high-frequency masts at Daventry, Northamptonshire, which have been transmitting since the 1920s, have been superseded by other facilities at Woofferton.

Only one 99m-high triangular mast will remain.

The job, which would have been testing enough at the best of times, is complicated by the fact that the Daventry site is one of the largest Iron Age hill-forts in the country. Archaeologists, who have not yet had a chance to investigate the site thoroughly, are anxious that the shallow ground remains undamaged. The remains of a Roman villa have been found on land next to the BBC site at Boorough Hill.

The solution was to land the masts on a bed of timber railway sleepers capped with layers of rubber tyres, held together with plastic mesh.

Placing this protection required a Special Scheduled Monument consent, as depositing material on a monument is not normally permitted.

The biggest structures on the site are two 152m-high triangular masts, but they will be dismantled to about 50m before being felled (the BBC ruled out the use of explosives). There are four self-supporting lattice steel square towers, two 107m-high and two 35m high. The rest of the masts are square or triangular in plan, between 46 and 99m high with three or four stay levels.

Completion of the works at the end of September will allow the site to be returned to grazing land - after a history as a major broadcasting site that spans the history of broadcasting itself.

Construction Weekly, 3 February 1993.

Transporter Bridge Restored

Gaining access to an historic structure on which the traditional methods of access are rusting away has proved a challenge for scaffolding company Deborah Grayston, part of BET Plant Services.

It has provided scaffolding to the 77m high legs of the Newport Transporter Bridge in Gwent, allowing full access to the legs without putting any avoidable extra load on them.

The scaffold allows rusting elements to be replaced - the first phase in a three-part restoration of a most unusual structure.

The bridge is one of only three transporter bridges working in the world, and the only one with the distinctive 'transbordeur' style of French engineer Ferdinand Arnodin.

The road-level gondola, which can carry six or two trucks, is suspended by cables from a trolley that runs along the underside of the main girder. This girder, which spans the entire river, gives no impediment to shipping in the way that a swing or lifting bridge would have done.

Completed in 1906, the bridge suffered progressive decay, and

in June 1985 Gwent County Council closed it because the staircases and access platforms used for routine maintenance were too badly corroded for safety.

Following a campaign for funds to help with the £2.75m restoration cost, support came from the Architectural Heritage Fund of the EC, Cadw (Welsh Historic Monuments), and the Welsh Office.

As soon as the scaffold went up, a detailed inspection and structural survey were done. As a result of this Structures (Teesside) is replacing elements ranging from very small components up to some of the main lattice girders. the largest single steel pieces it is replacing are 5-6m long.

Phase 1 is due for completion in the next couple of months. Contract 2, for the highly corroded main cables that support the main girder, will be let soon, and the third and last stage will be refurbishing the main girder.

Despite the amount of work that needs doing, the project engineer is increasingly impressed by Arnodin's creation. "The more we look at it, the more we respect the original designer," he says. "Some of the methods he used were very impressive."

Construction Weekly, 27 January 1993.

International Biographical Dictionary of Civil Engineers

An invitation has been received from Dr Frank Griggs FASCE, who visited Australia in 1990 to contribute articles of four pages of foolscap single spaced, on eminent civil engineers who lived and practised in Australia essentially in the years 1800 to 1900.

It is suggested that the following are appropriate :

John Whitton (1819-1898) NSW ; Henry C Mars (1827-1916) Vic/SA ; Joseph Brady (1828-1908) Qld ; and Thomas Higginbotham (1819-1880) Vic. Also to be considered is C Napier Bell (1836-1906).

Details, suggestions, and offers of authorship to Denis Cumming, 83 Beamish Avenue, Brentwood, WA, 6153.

The Development of Sewerage Systems

Sewerage design is a struggle with contours. The Victorian engineers who developed Britain's public sewerage systems were aware of the need to achieve self-cleansing velocities.

The more so, because at that time almost all sewers were combined ones, carrying wastewater and storm water.

The Victorian engineers realised that an egg-shaped sewer (point downwards) would facilitate better velocity characteristics at low flows, because under those conditions it would mirror the hydraulic performance of a small circular pipe. A standard form of cross section was quickly developed, a width:height ratio of 2:3 being chosen because that made the complex calculations of areas and perimeter somewhat easier.

By using egg-shaped sewers, the Victorians were able to save several feet of fall per mile, often avoiding the need for pumping stations, and still achieve self-cleansing velocities during periods of low flow.

There was another factor that enabled the Victorians to reap the 'velocity dividend'. In those days, sewers were usually constructed using clay pipes or bricks.

It mattered little to the bricklayers what shape of cross section the engineers wanted to use, so egg-shapes began to be constructed, especially where the available fall was limited. Perhaps half of all brick sewers in Britain are egg-shaped.

As clay pipes are manufactured by extruding the clay under pressure through dies, then firing in a kiln, it was possible to make egg-shaped clay pipes.

Egg-shaped clay pipes did not predominate as much as the larger sizes (ie. trunk sewers with flatter gradients) where the 'velocity dividend' was most needed.

In the years after the First World War precast concrete circular pipes became more widely available, culminating in a first British standard in 1934. The early pipes had simply been cast in a mould, as any in-situ concrete, with compaction of the concrete often sought by simply banging on the mould.

Gradually, machines were developed for manufacturing concrete pipes. The first ones did this by vertical casting, with mechanical compaction applied to the concrete. Initially this was by simple vibration and, later on, by radial compacting.

As concrete was introduced into the mould it was compacted by being thrown outwards under centrifugal force.

The 'spun' type of pipe gave a much more compact (and therefore durable) concrete and so in the years after the Second World War, particularly in the building boom years of the sixties and early seventies, most British engineers insisted on 'spun' where public sewers were to be laid using concrete pipes.

Market forces dictated that clay pipes predominated below about 18 inches diameter and concrete ones above that size. The situation is much the same today.

Concrete pipes (and, of course, clay) could be manufactured and laid more cheaply than brick culverts and so, because of the insistence on 'spun' ones, the egg-shaped sewer fell largely into disuse in the UK.

The situation on the mainland of Europe was not quite the same as in the UK. Spun concrete pipes were not insisted upon and engineers were much more ready to accept vertically cast products. In time, however, flexible joints became the norm

throughout Europe and so, because of the difficulty of producing an equivalent joint for egg-shaped pipes, they are today not used as much for sewers on mainland Europe as they were, though significant quantities are manufactured and used for surface water and land drainage work.

During the 1970s and 1980s major technical advances were made in the manufacture of cast concrete pipes.

Yorkshire Water and ARC realised in discussions that egg-shaped sewers died out in the UK simply because spun concrete pipes took over from brick culverts. Having appreciated that fundamental point, it was a short step to recognising that modern vibration machines do not necessarily require pipes to have a cross section symmetrical about any plane.

For Yorkshire Water and other sewerage undertakers the potential benefits relate not so much to capital costs as to operating costs. The re-introduction of the 'velocity dividend' will undoubtedly mean, as it did to the Victorians, that some sewers will be able to be laid without the need for pumping. The very fact of using egg-shaped pipes in lieu of circular ones at the same gradient will ensure higher velocities at low flows - thereby reducing the risks of siltation and blockage.